



New Excavations at El-Kurru
Beyond the Napatan Royal Cemetery

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Front cover: The descendency of Tomb IV T 1 near Sedeinga under excavation (© V. Francigny / SEDAU).

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New Excavations at El-Kurru: Beyond the Napatan Royal Cemetery

Introduction

Geoff Emberling and Rachael J. Dann

A powerful dynasty consolidated its authority in the region of ancient Napata (modern Kareima and Merowe) in northern Sudan in the years after 800 BC, and would go on to rule Egypt as its 25th Dynasty (c. 750-655 BC). The rise of this Napatan dynasty has remained unexplained since George Reisner first discovered the burials of these kings and their predecessors in his excavations at el-Kurru and Nuri between 1916 and 1920 (Reisner 1919; Dunham 1950; 1955). Five kings buried at el-Kurru exercised control over Egypt: Kashta, Piye (or Piankhy), Shabako, Shebitqo, and Tanutamani. Of the 25th Dynasty kings, only Taharqo, a son of Piye, was buried elsewhere: at a new royal cemetery he founded at Nuri, upstream of the cult centre at the holy mountain of Jebel Barkal and the likely administrative centre at Sanam (Plate 1).

During this period, the Napatan elite adopted elements of Egyptian culture, for reasons that remain unclear. The worship of Egyptian deities including Amun in ram-headed form continued from the earlier period of Egyptian colonial domination (c. 1500-1100 BC), and new elements include the use of hieroglyphic writing, highly skilled artisanship that is Egyptianizing if not quite Egyptian, introduction of mass-produced pottery, and a transition to royal pyramid burial. Reisner identified the earliest burials at el-Kurru as being

those covered by tumuli, with later burials developing into tumuli with rounded enclosure walls, then small rectangular enclosures, and finally Egyptian-style pyramid burials with kings in one area and queens in another. Even the earliest burials contained unusual wealth, despite having been looted, perhaps supporting Reisner's notion that these burials were the beginning of a sequence of elite or royal burials (cf. Edwards 2004, 102, 118).

Despite knowing the sequence of these rulers, the absolute dating of the el-Kurru tombs has been the subject of debate, with some supporting a date for the earliest tombs in the 11th century BC that eliminates a 'dark age' after the collapse of the Egyptian New Kingdom, and others maintaining a date closer to Reisner's estimates in the 9th century BC (Török 1999; Kendall 1999a; cf. Heidorn 1994).

Beyond chronology, many questions remain (see Kendall 1999b). We do not know the source of these rulers' political authority or the economy that supported them. Possibly the Napatan dynasty emerged from a local family that had participated in Egyptian colonial rule like that of Heka-nefer, the local prince of Miam (Aniba) in Lower Nubia (Simpson 1963), and who may have exercised greater authority in the absence of Egyptian control. They may have been members of the Kushite elite who had lived in Egypt and returned after the collapse of the empire, initiating a process of selective adoption of Egyptian practices. Given the clear prominence of the Amun cult, political authority may have developed alongside religious authority, perhaps in relation to Egyptian priests who either maintained Amun temples after the collapse or who came to re-open Amun temples in Nubia after a lapse of time. It also remains unclear why el-Kurru was chosen as the royal burial site of the 25th Dynasty, when it is apparently surrounded by areas with greater agricultural potential.

There are several ways in which these obscurities might be approached. Related questions are being investigated at Amara West, Kerma, Kawa, Merowe Sheriq, Sanam, Tombos, and Hillat el-Arab (see for example Ahmed 1992; Binder 2011; Darnell 2006; Godlewski 2008; Lohwasser 2010; Smith 2008; Vincentelli 2006; 2011; Welsby 2011). Yet el-Kurru, the site of the royal cemetery itself, remains crucial to our understanding of the complexities of the period. Given the historical significance of the site, we have returned to the site to begin new investigations in and around the royal cemetery nearly 100 years after it was first excavated by Reisner.

The International Kurru Archaeological Project (IKAP) is a collaboration co-directed by Dr Geoff Emberling (Kelsey Museum of Archaeology, University of Michigan), Dr Rachael J. Dann (University of Copenhagen) and Professor Abbas Sidahmed Mohammed Ali (University of Dongola, Kareima), and comprises three related components. Dr Emberling's team have begun work to re-locate elements of the town site. Dr Dann's team are investigating areas in and around the royal cemetery. Professor Abbas Sidahmed Mohammed Ali will begin work to preserve the cemetery and



Plate 1. Sites in the region of Napata.

present it for visitors, a cultural heritage project made more relevant because he grew up in el-Kurru village. This portion of the project will begin in the coming field season. The first results of the winter 2013 season are presented here.¹

Investigating Settlement at El-Kurru

Geoff Emberling

George Reisner's excavations at el-Kurru focused on the royal cemetery (Reisner 1919), but also recovered elements of a town nearby that he excavated partially but never published, only recording them briefly in his field notebooks. Many important details about these structures, including their location, method of construction, state of preservation and any associated remains, were often not documented. Kendall republished Reisner's observations on some of the structures in 1999 (Kendall 1999a), but they have not previously been relocated. The objectives of the University of Michigan team in the first season were to locate and investigate five of these structures. These were:

- a 200m length of city wall with outer and inner gateways
- a rock-cut well with surrounding staircase
- a smaller length of fortification wall built of stone
- two rock-cut structures identified by Reisner as mortuary temples (Figure 1).

Locating whatever might remain of a settlement near the cemetery might begin to provide answers to some questions about dynastic chronology, the sequence of Egyptianization and questions about how broader Napatan society was constituted.

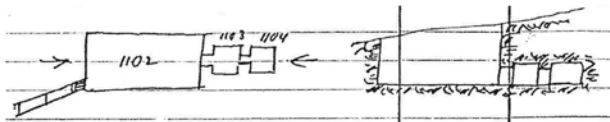
Attempts to relocate these elements of occupation outside the cemetery were made using analysis of multispectral satellite images, high-precision topographic survey, magnetometry and resistivity (see Mohamed-Ali, below), geological coring (see Skuldbøl, below), and excavation. However, the most reliable method of locating ancient remains was simply talking to people in the village of el-Kurru – their memories of Reisner's excavation and more recent experiences of ancient remains in and around the village often proved to be extremely accurate. In the end, we were able to locate four out of five of Reisner's structures and to begin investigation of them (Plate 1).

The location of the city wall, following leads given by people in the village, was investigated by geophysical survey (see Mohamed-Ali, below), excavation, and by a program of coring in conjunction with small soundings (see Skuldbøl, below). Together these methods also identified three stretches of what we think may be Reisner's city wall (the best-preserved and most thoroughly investigated section illustrated in Plate 2). The wall in question is 2.35m thick, built of rubble and faced with shaped sandstone blocks about 500mm in length, and preserved six courses high, about 1m. We recovered other segments of this wall directly aligned with it about 10m away in either direction. As the photo shows, however, a second wall is abutted to the first, which complicates its interpretation as a city wall. Further complicating interpretation, nearly all the associated pottery, which came from an ash dump against the outer (Nile-facing) side, was Classic Christian pottery of

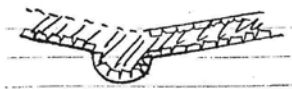
¹ Work in the field began on 2nd January and ended on 4th February, 2013. Thanks first to Dr Abdelrahman Ali, Director General of the National Corporation for Antiquities and Museums (NCAM) and to el-Hassan Ahmed Mohamed, Director of Excavation at NCAM. Project participants included (in chronological order) a geophysics team from the University of Dongola at Wadi Halfa led by Professor Mohamed Abdelwahab Mohamed Ali and assisted by Abdelhaleem Haroun Abou and Musaab Hussein Eltoum; Murtada Bushara of NCAM; Prof. Tim Skuldbøl of the University of Copenhagen; Dr Jack Cheng; Mr Robert Corrie; Mahmoud Suliman Bashir of NCAM; a second geophysics team led by Dr Ed Blinkhorn and assisted by Elise Thing and Johanna Greaves; and Dr Anders Hastrup of the University of Copenhagen, a cultural anthropologist interested in cultural heritage. Funding was provided by the National Geographic Society (grant #9173-12 to Emberling), by a gift of Ms Kathleen Picken to the University of Michigan, and by the Danish Institute in Damascus and the Department of Cross-cultural and Regional Studies at the University of Copenhagen.



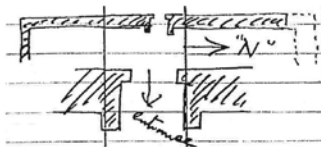
Plate 1. Preliminary topographic map of el-Kurru (prepared by Tim Skuldbøl and Robert Corrie) overlaid on Google Earth image of the area.



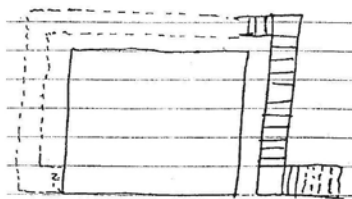
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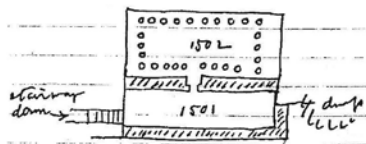
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e

Figure 1. Sketches from Reisner's notebooks (courtesy of the Museum of Fine Arts, Boston). a. Small rock-cut 'mortuary temple', perhaps a private residence (Ku. 1100; Reisner notebook IX Kurru, p. 754). b. Section of stone fortification wall (Ku. 1200; Reisner notebook IX Kurru, p. 752). c. City wall 200 meters long with double gate (Ku. 1300; Reisner notebook IX Kurru, p. 754). d. Rock-cut well with staircase (Ku. 1400; Reisner notebook IX Kurru, p. 765). e. Large mortuary temple (Ku. 1500; Reisner notebook IX Kurru, p. 765).



Plate 2. The 'city wall' in Sounding 2, looking west.

the 8th-11th century (see Skuldbøl, below), obviously not corresponding to the expected Napatan date for the settlement. The ash dump was unusual in containing relatively little faunal material, and may in any case have been dumped against the wall after the wall was no longer in use. This wall does not appear to conform to usual methods of wall construction in Christian times, but further investigation will be necessary to understand its full extent, date, and function.

Together, these investigations of the location of the city wall revealed a geologically complex set of deposits including sand and gravel washed in from the desert, Nile silts, and occupation deposits interspersed throughout the modern area of the palm groves.

Reisner's rock-cut well was found extending under the wall of a house in the village (Figure 2, Plates 3 and 4). Reisner had identified it in 1919 as being under the courtyard wall of the house of a man named Gâb-ullah, and his descendants remembered its exact location after several days of discussion. The well comprised a rectangular cut into the rock about 5 x 6m in area, but its edge was preserved only on 3½ sides within the excavated area, so further excavation will be

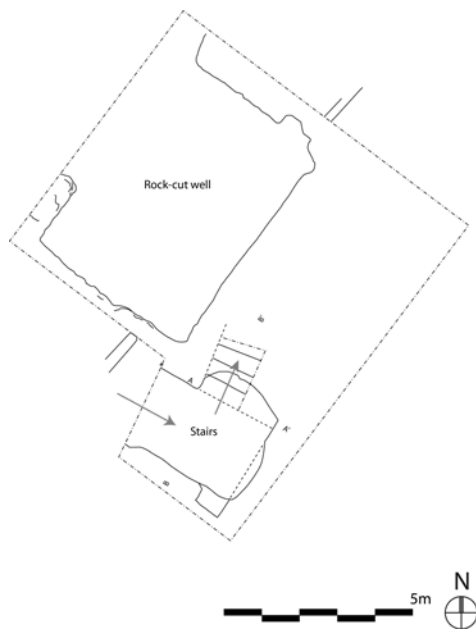


Figure 2. Plan of the rock-cut well - scale 1:200 (photo in Plate 3)
(Drawing by Jack Cheng and Geoff Emberling).



Plate 3. The rock-cut well (plan in Figure 2). The cut is visible under the meter stick, with ashy fill in the well itself.



Plate 4. The staircase associated with the rock-cut well (plan in Figure 2). White steps are visible below, as is the arched ceiling of the passageway.

required to understand the structure in detail. Its filling was noticeably damp, even close to the modern surface. A large staircase adjacent to the well was excavated to a depth of nearly 5m and very well preserved stone steps leading down into a tunnel cut into the rock were discovered (Plate 4). Fuller excavation of both of these structures is clearly warranted. Currently it is impossible to understand the broader architectural context or the date of these structures: all of the material found was 20th century garbage, much of it presumably dumped in after Reisner's excavation. Reisner assumed that the well and staircase were part of a palace of Piye, and the massive scale of the staircase in particular are certainly suggestive of royal activity.

The location of Reisner's smaller rock-cut 'temple' was also well known by people in el-Kurru, and its location was confirmed by clearing the tops of its walls. The outer room is approximately 8m in length. Our initial impression, however, is that this is unlikely to have been a temple. The structure has a different orientation than would be expected, it is some distance from the royal cemetery, and it is very roughly constructed. Reisner indicated that the structure had three rooms, two of which were entirely subterranean, and if this is the case it is likely that the structure is quite deep (see Figure 1a). It is possible that some part of the ancient settlement at el-Kurru consists of rock-cut structures.

Reisner himself provided the best clue to the location of the larger mortuary temple, stating in his notebook that it was situated directly between the large pyramid at the site (Ku. 1) and the Nile (Plate 5). Inspection of Google Earth



Plate 5. The location of the mortuary temple (Ku. 1500) with the large pyramid (Ku. 1) in the background, looking west.
The temple is underneath the tree in the foreground.

imagery showed a clear rectilinear feature in approximately the right place. People in the village confirmed the location of a structure there, which they called 'kaneesa', or church. The temple measures 15 x 15m in size with two outer rooms, one of which contained 26 columns, all of them preserved to more than 2.5m in height (Figure 3, Plate 6). The columns would have supported a roofing system that at least partially covered the space; notches cut into the bedrock on each side of the long rows of columns were undoubtedly part of this

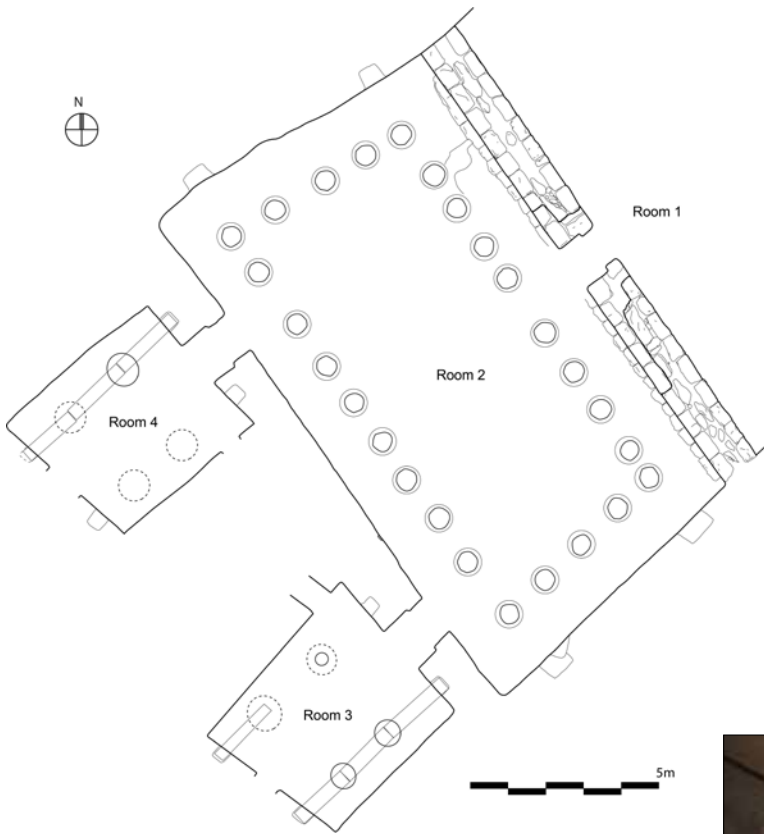


Figure 3. Plan of the large mortuary temple - scale 1:200
(Drawing by Jack Cheng and Geoff Emberling).

roofing system. Quarrying marks suggest that the space was initially used to quarry stone for construction of pyramids in the royal cemetery – others are known in the immediate area – and that its use as a temple was a later development. We cleared the room with columns (Room 2) down to the level of its stone construction surface in some areas (at least one living floor was higher), but did not significantly excavate the outer room (Room 1) this season.

Perhaps the most surprising aspect of this temple is the existence of rock-cut doorways not identified by Reisner that lead into a network of underground chambers (Figure

3, Plates 7 and 8). The two outer chambers each had four columns supporting stone roof beams to prevent collapse of the poor quality sandstone, and each had two doorways leading to other rooms. Other doorways may also be present. One of these rooms had capitals with five volutes, an unusual configuration that finds its closest parallel in Ptolemaic Alexandria (see Cheng, below). The second room had simpler lotus capitals. It is possible that these interior columns were a later addition to the temple, but if they were original to the construction, they would suggest a Meroitic date for the initial use of these interior rooms.

Excavation of these rooms was complicated by extremely hard deposits inside, the very soft stone of the columns, and most seriously, cracks in the ceiling. These problems meant that full excavation of the structures was impossible. Further work in this complex will require the assistance of a structural engineer to avoid injury to participants as well as to future potential visitors to the site. The discovery of the doorways and rock-cut chambers suggest that although Reisner had



Plate 7. The southern rock-cut chamber (Room 3) looking south west. Column and stone roof beams visible at left, with fallen column capital visible at right. Both capitals have five volutes (see Cheng, below).



Plate 8. The northern rock-cut chamber (Room 4) looking south west. Columns with plain lotus capitals and stone roof beams visible to right, and a doorway to a room not yet excavated is visible in the background.



Plate 6. The outer room (Room 2) of the large mortuary temple. Rock-cut doorways to Rooms 3 and 4 are visible in the back wall of the room.

located the temple and correctly specified the number of columns, he did not excavate the structure to any great extent.

The date of this temple is difficult to specify at this point. Reisner's guess that it was associated with the large pyramid on the site is plausible, but the date of that pyramid is disputed. The construction of el-Kurru pyramid 1, with stone block facing and rubble core, is very much like the later (outer) pyramid of Taharqo at Nuri, but for the moment we only know that this pyramid was built at the time of Taharqo or later. Reisner discovered a similar mortuary temple, also located in what had been a quarry immediately adjacent to the Taharqo pyramid. It is not clear that he excavated that temple thoroughly either (Nuri 400; see Dunham 1955, 217, fig. 215).

Reisner's notes also mention a 'squatter' level in the el-Kurru temple. Approximately a meter above the original floor, we discovered painted Meroitic ceramic vessels *in situ* (Figure 4, Plate 9), alongside a wealth of graffiti typical of the Meroitic period including an archer

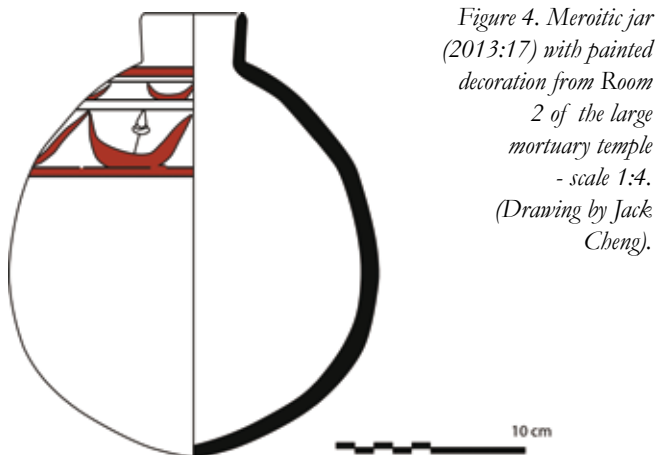


Figure 4. Meroitic jar (2013:17) with painted decoration from Room 2 of the large mortuary temple - scale 1:4. (Drawing by Jack Cheng).



Plate 9. Large Meroitic jars in situ in the north-west corner of the columned room (Room 2) of the large mortuary temple.

and other human figures, horses, and 'demon' figures in addition to many geometric motifs (Plate 10). These graffiti will reward intensive study in future seasons.

In summary, the 2013 season in the el-Kurru settlement succeeded in locating four of five structures located by Reisner in 1919. The remains are monumental in scale and will clearly repay further research. Finds this season were primarily of the Meroitic and Christian periods, however, and the location of a possible Napatan settlement remains unclear. It is worth noting that despite the abundance of Christian pottery found around the 'city wall' at the edge of the palm cultivation, there had been no trace of pottery on the surface. Further work around the city wall in particular may provide evidence of underlying Napatan structures.

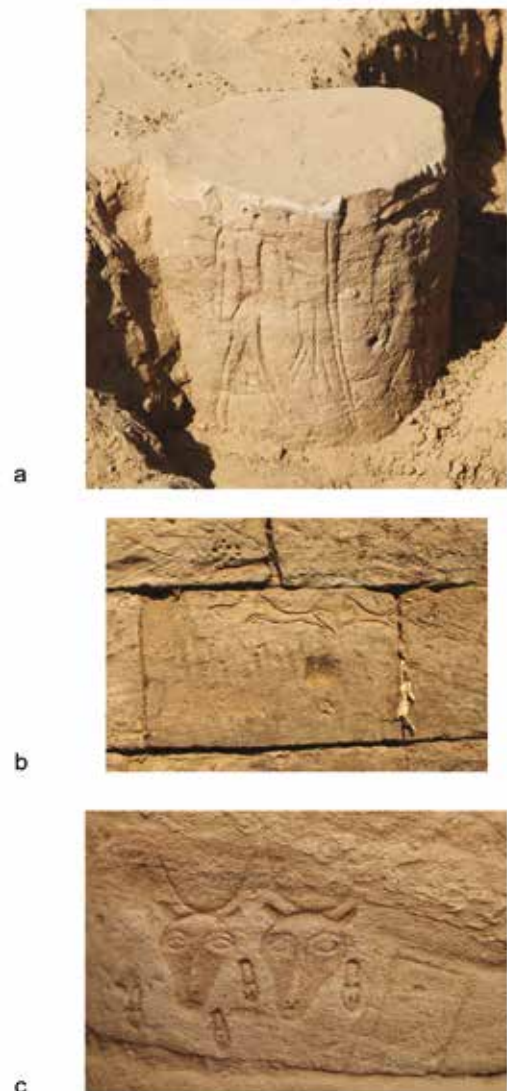


Plate 10. Meroitic graffiti in the columned room (Room 2) of the large mortuary temple. a. Archer; b. Horses; c. Human-headed bovine "demons" with disarticulated hooves. Note red paint on faces and enclosure to right.



Geophysical Prospection in the Archaeological Settlement of El-Kurru

Mohamed Abdelwahab Mohamed-Ali

At the beginning of the 2013 season at el-Kurru, magnetic survey ('magnetometry') was conducted in two areas on either side of a modern water channel to investigate areas identified by people in el-Kurru village as being the location of the rock-cut well and city wall identified by Reisner in 1919 (see Emberling, above). Four areas were also selected for investigation by resistivity based on anomalies in the magnetometry results. Investigation of the anomalies through excavation was begun in 2013, and we can report partial success for both methods in identifying some archaeological features in the matrix of sand and Nile mud that characterizes el-Kurru.

Magnetic survey

Magnetic survey is usually used in order to define the horizontal extent of archaeological features. The technique relies on contrast between the magnetic susceptibility of targets and their surroundings (Kearey and Brooks 1991; Jeng *et al.* 2003) and can cover a large area relatively quickly, as much as a half-hectare per day with the methods and equipment used in this study. Magnetic survey was carried out using a Geoscan Fluxgate Gradiometer (FM256) in two areas at el-Kurru (Plate 1). The survey was laid out in a squared grid pattern (20 x 20m). The measurements of each grid were collected in parallel traverses 500mm apart with a sample interval of 250mm. Magnetic results are presented as greyscale images with negative values showing up as white and positive as black. Geoplot software was used for preparing the master of the raw data. Despiking and spatial filtering and other process were used to enhance subtle patterns and weak signals and to suppress unwanted noise.



Plate 1. Location of magnetic survey Area I (grid squares 1-8) and Area II (grid squares 9-14).

Electrical resistivity tomography

Electrical resistivity tomography (ERT) is used to measure the electrical resistivity of subsurface material, and unlike magnetometry, has the possibility of specifying the depth of anomalies under the surface. ERT data were processed with the RES2DINV software (Loke and Barker 1996), and visualized as electrical resistivity sections. Electrical resistivity tomography survey was carried out on four locations at el-Kurru (Plate 1) using Wenner and dipole-dipole electrode arrays. These profiles were intended to test the applicability of resistivity tomography for estimating the vertical extensions of the detected magnetic anomalies. An electrode spacing of 500mm was preferred in these profiles to resolve the anomalies more precisely.

Geophysical data and results

Magnetic survey Area 1 was located in the area of the proposed well near the former house of Gâb-ullah that Reisner had mentioned in his notes (see Emberling, above). The survey covered an area of about 3,200m², being designed to prospect for archaeological features in this part of the site. The magnetic map of Area 1 (Plate 2a) shows some anomalies that may be associated with structures. These anomalies are indicated by yellow arrows in Grid 1. The anomaly in Grid 3 turned out after excavation to have been associated with modern garbage that was not visible on the surface. Grid 5 shows interesting anomalies indicated by arrows. At the loca-

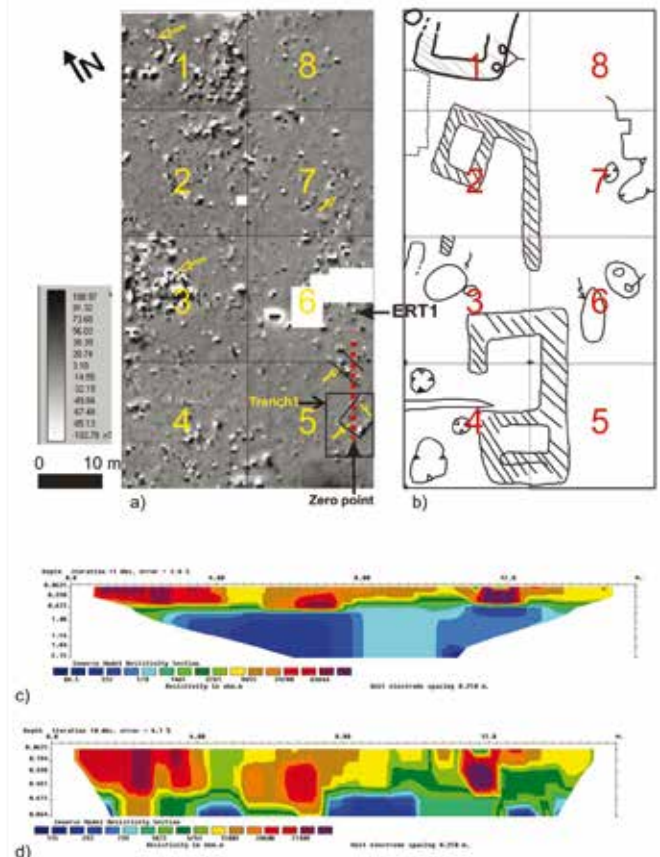


Plate 2. Results of magnetometry and resistivity in Area I.

tions of these anomalies we carried out resistivity tomography line ERT1 using both Wenner (Plate 2c) and dipole-dipole (Plate 2d) electrode configurations. The magnetic anomaly indicated by the arrows in the northern part and in the middle of Grid 5 coincides in Plate 2c with the high resistive anomalies seen at distances first of 4m, at 6m and at around 12m. The inversion results of the same ERT line using dipole electrode configuration (Plate 2d) confirmed the indicated resistivity anomalies.

The first excavated square was located along the east edge of Grid 5 (Plate 2a). It was excavated to a depth of about 750mm. We found at that depth (Plate 3) a large sandstone



Plate 3. Excavation in Area I, Grid 5, looking north west.

outcrop on the north-west side of the square, with fill containing Classic Christian pottery and some animal bone on the south-east side of the square. Holes excavated into the outcrop are probably also related to the Christian occupation. The north-west section of the trench shows layers that include a 'dark mud' layer that must be a flood layer, and an upper dark layer that is instead ashy and probably modern garbage.

Area II covered about 1,830m² east of the water course (Plate 4) situated to identify Reisner's 'city wall'. The area was surveyed first using magnetometry and then ERT survey on profiles selected based on magnetic results. The magnetic map shows magnetic anomalies (indicated by yellow arrows on Plate 4a) in the area proposed for ancient buildings as reported by people in the village. The resistivity anomaly at the right end of ERT2 (Plate 4b) coincides with the magnetic anomaly indicated by the arrow in the northern part of magnetic Grid 9 (Plate 4a). The resistivity anomaly at the right end of ERT3 (Plate 4b) may be associated with the dry sand anomaly in the western part of magnetic Grid 9.

The second excavated trench (Trench2) is a 5 x 5m square located in the central part of Grid 9 (Plate 4a). The excavation recovered a corner in a large wall made of stone (Plate 5). Within the corner was a great deal of fallen stone along with fewer fragments of baked brick. In the north corner, there was an additional stone wall at a lower level, probably an

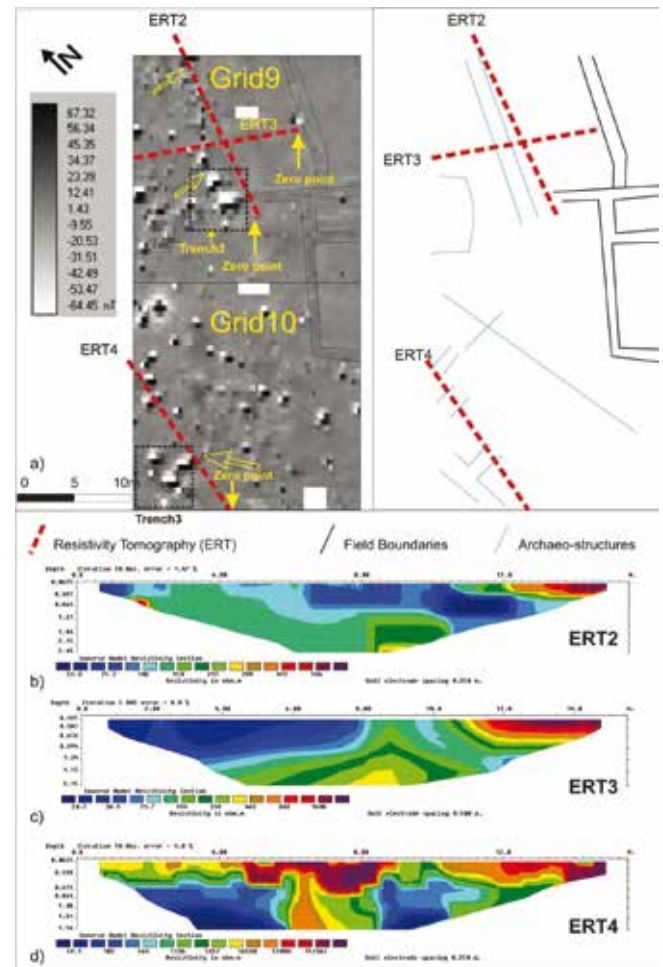


Plate 4. Results of magnetometry and resistivity in Area II.



Plate 5. Excavation in Area II, Grid 9, looking north west.

earlier construction. The tops of the walls appeared 300mm below the surface.

Some of the most important magnetic anomalies in Grid 10 (Plate 4a) are those seen in its south-western part. Inversion results of ERT4 confirmed that the magnetic anomalies were also bodies of high resistivity at distances from 5m to 9m and at the end of the line. The area in the west corner of Grid 10 was investigated in Trench 3. This 5 x 5m square contained mud-brick architecture in its eastern half (Plate 6).



Plate 6. Excavation in Area II, Grid 10, looking south west.

It is relevant here to note that another sounding further south west found a stretch of stone wall with mud-brick walls built next to it (see below, Skuldbøl Plate 3).

As part of our effort to locate Reisner's city wall, we set up a narrow, elongated grid extending south east into the palm groves, toward the Nile. It did not locate major architectural remains, but some magnetic anomalies can be seen and these anomalies are indicated by yellow arrows in Plate 7.

The first season of geophysical prospection at el-Kurru was intended primarily to test methods and to begin the process of comparing magnetometry and resistivity to excavation results. These first tests showed that while there are some correlations, further testing in the conditions at el-Kurru is necessary. We hope to continue this work in future seasons.

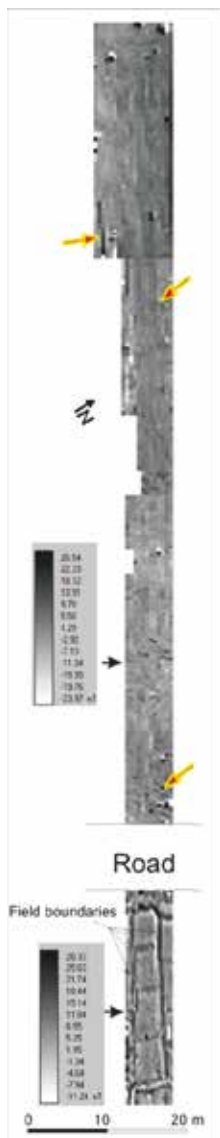


Plate 7. Magnetometry grid squares extending toward Nile.

Coring and Soundings in the El-Kurru Settlement

Tim Boaz Bruun Skuldbøl

A coring and sounding program was initiated in and next to the palm cultivation zone at el-Kurru in order to locate, define and investigate ancient settlement remains. The study also aimed to investigate aspects of rubbish disposal in pre-modern settlements. Parallel garbage management studies of early and late urban societies are currently being conducted by Tim Skuldbøl at Tell Brak (Syria), Bab-w-Kur (Iraq) and al-Zubarah (Qatar) (Skuldbøl *et al.* in prep). The specific combination of methods (coring and soundings) developed for these studies have proven to be extremely useful for intrasite settlement studies, particularly in combination with surface survey. As noted above, investigations by Reisner in 1918-19 showed that substantial remains of one or more settlement phases were to be found along the edge of the cultivation zone and between the modern village and the Nile.

Area of investigations and coring obstacles

The predefined area for our first investigations took place in an area of approximately 400 x 400m that encompasses two strips of land between the Nile and the modern village of el-Kurru. The smallest is made up of a barren and uninhabited strip of desert land along the eastern edge of the modern village. Modern cemeteries and the dumping of garbage here made it evident that this area has long been considered the edge of the modern habitation. Further towards the Nile, there is a cultivation zone about 300m wide, with irrigated fields and plantations with date palms and mango trees. A network of earthen pathways and modern irrigation channels criss-cross the area. However, the most significant modern feature is a large but unfinished water transportation channel (*c.* 5m wide, 3m high) constructed within the past ten years which runs from village to village along the edge of the desert. Other less visible modern features include soil heaps and large pits, which together make the study area very complex.

As part of our preliminary inspections of the area, nine locations said to contain cultural remains (soil including ashy lenses, potsherds or baked brick remains) were pointed out to us by Mansur Mohammed Ahmed (one of the NCAM site guards at el-Kurru). Other potential areas for investigation were recorded by the Sudanese magnetometer survey team of Prof. Mohamed A. Mohamed-Ali (above), which surveyed two areas along the edge of the cultivated zone. Identification of a long, 3m to 4m wide, low and irregular earthen feature that runs *c.* 70m along the edge of the vegetation zone and close to the water transportation channel became another feature to investigate. We suspect this feature to be one of Reisner's excavation dumps from the excavation of a 'city wall and gates' that he records finding. Finally, a small number of

cores and a few soundings were randomly distributed across the study area.

For the coring project at el-Kurru, we used hand auger equipment (gouge auger with a diameter of 30mm) (Plate 1). The initial test of coring gear showed that coring within the modern village itself would be a major challenge. Difficulties were mainly due to subsurface sandstone outcrops that were present everywhere. Heavy erosion of cultural deposits (modern as well as ancient) was another major challenge. In general, cultural deposits above the sandstone outcrop in and along the edge of the modern village were thin and poorly preserved and often would not stick to the coring gear. Further testing of gear within the cultivation zone east of the modern village presented us with other challenges. Here deposits were dense, compact and deep. Thus, extracting the gear from the soil was quite arduous.

Apart from the cultural deposits, two kinds of soils were common in cores and soundings. When coring in the cultivation zone, Nile mud or silt from regular Nile flood events was omnipresent. *Wadi* and sandy desert deposits made up the second major soil type. Along the edge of the cultivated zone, a mix of soil deposits was very common.

Results of the coring-sounding programme

In total 26 locations were explored by coring and seven locations by the excavation of soundings (Plate 2). Despite the challenges, significant results were achieved during the two weeks of coring and excavation of soundings. In most locations where coring was conducted, we noticed small



Plate 1. Settlement investigations by coring at el-Kurru.

fragments of baked clay or brick in the soil, sometimes at depth of 2m or more. These fragments certainly represent human activity in the past. Cultural deposits were recovered in nine core locations (Cores 7, 8, 10, 12-15, 19 and 21). It is uncertain what activities produced any of these deposits of cultural material. Five other core locations might also contain cultural deposits (Cores 6, 9, 11, 17 and 22), though the evidence remains inconclusive.

Seven 2 x 2m soundings were excavated in order to supplement and test the coring results. Apart from Sounding 5, all soundings were placed along the edge of the present vegetation zone. Deep cultural deposits were found in Soundings



Plate 2. Location of cores and soundings at el-Kurru.

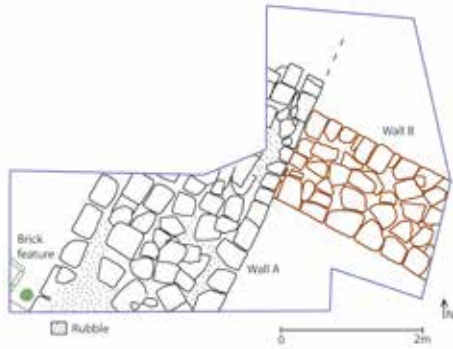


Plate 3. Sounding 2: Drawing and photo of Walls A and B.

1-3 and 7, and potsherds were found in all but Sounding 5.

The most significant remains of ancient occupation were recovered in Sounding 2. Below a half meter of sand deposits and next to what we believed to be one of Reisner's excavation dumps, we recovered the remains of a very large and intriguing stone wall (Emberling above; Plate 3, Wall A). The wall was built in a casemate-like fashion with wall faces made of large, dressed ashlar sandstone blocks of which the largest blocks measured 500 x 300 x 200mm. In contrast, the core of wall was made from a mix of dressed and undressed stones, stone rubble and unbaked mud-brick material. When extending Sounding 1, a further wall (Wall B) which abuts Wall A was defined. Although Wall B is not architecturally bonded with Wall A and is thinner than Wall A, it is likely that it was built a short time after Wall A. In the final days of excavation, a segment of Wall A was unearthed in Sounding 7 located about 10m from Sounding 2. Altogether this evidence suggests that these wall segments could be a large fortification wall or a non-defensive enclosure system, but either way is likely to be the same wall that Reisner discovered almost a hundred years ago.

A number of intriguing questions remain to be answered in order to explain the function and especially the date of this structure. First, in Sounding 2 a small mud-brick feature and mud-brick wall was found abutting the western side of Wall A (Plate 4). Pottery recovered from excavating these features were all Classic Christian in date suggesting a construction



Plate 4. Brick feature and basalt grinder on west side of Wall A.

date of both the mud-brick wall and feature and Wall A in this period. However, piled up against the eastern side of Wall A, we uncovered several large deposits of garbage with pottery dating to the Classic Christian period. The recovery of a similar ashy trash deposits on top of Wall B suggests that these garbage deposition activities must have taken place in the Classic Christian period and soon after this structure went out of use. Secondly, there are few good parallels for the use of large, dressed sandstone architecture in the Classic Christian period, or for the use of the construction technique described. The reuse of dressed stone blocks in Christian fortifications has however been noted at Merowe Sheriq (Godlewski 2008). The system of fortifications or fortified settlements at Merowe Sheriq which date from the Early to the Classic Christian period seems at the moment to be the best parallel for the finds at el-Kurru and for these reasons we tentatively suggest a Classic Christian period date for this enclosure wall.

In Sounding 1, more Christian garbage deposits appeared, and in Sounding 3 a thick deposit of construction debris was unearthed, primarily consisting of large numbers of fallen red-bricks with brick sizes around 340 x 170 x 70mm, typical for the Christian period but smaller than Meroitic red bricks. Interestingly, the extensive distribution of ancient middens and open garbage dumps in this area on the outskirts of el-Kurru bears close resemblance to the rubbish deposition behaviour found in the village today. Regrettably, garbage deposits are often overlooked as an important tool in explaining settlement developments and intrasite settlement organization (Skuldbøl *et al.* in prep).

The preliminary evidence from Soundings 1-3 and 7 suggests that el-Kurru hosted a substantial occupation during the Classic Christian period. In support of this proposal is the

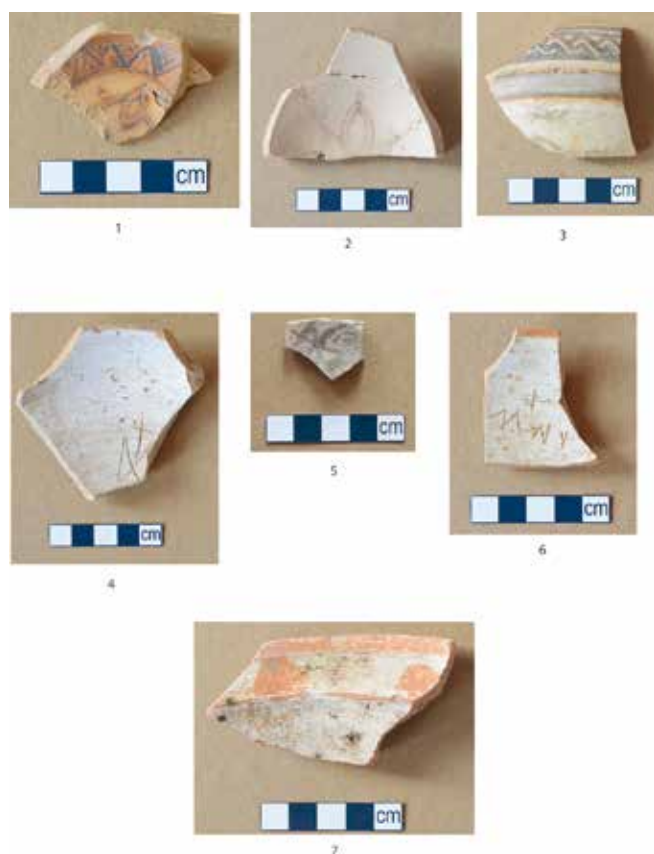


Plate 5. Classic Christian decorated pottery from Sounding 1 (nos 2 and 5), Sounding 2 (no. 4) and Area B2 (nos 1, 3, 6, and 7).

retrieval of several phases of mud-brick architecture in Area B2 and the habitation level just reached in Sounding 2. Although we cannot date the cultural deposits found while coring along and in the vegetation zone, the current evidence for widespread settlement activities in and beyond the village of el-Kurru is significant.

Classic Christian pottery from the el-Kurru settlement

In total more than 600 diagnostic potsherds were recovered from Soundings 1-7; however, most sherds derive from the garbage and debris deposits excavated in Soundings 1-3. Many potsherds were also small and worn, possibly as a result of being buried in open garbage dumps. Preliminary examination of the assemblage produced some interesting first results. Counts of vessel types from Soundings 1-3 showed that these assemblages were domestic in character, and though they produced a rich variety of vessel types the major part of the assemblages were made up by four vessel types. The most common vessel type was cooking pots (Figure 1: 1-2), which made up between 27% and 44% of the rims. Serving or cooking plates such as *doka*-like plates with incised crosshatching on the rim (Figure 1: 3-4) form another major vessel type and account for between 26% and 29% of the rims. The third most common vessel type was fineware or tableware cups (Figure 2: 5-7), which made up between 9% and 16%, and *qavadis* (Figure 2: 8-10), which

made up between 4% and 9% of the assemblage.² However, the impression is that both cups and storage vessels would account for a higher percentage if the distribution of vessel types were presented by estimated vessel equivalent rather than number of rims. This impression will have to be evaluated by more detailed study. All remaining types were found in lower concentrations and generally made up between 1% and 3% of the total.

A similar distribution of rim types was also noticed in Area B2. Here, fineware cups were especially numerous at the expense of the number of plates. Good parallels to the cooking pots, *doka*, fineware cups and storage vessels come from Old Dongola and the region of Merowe Sheriq (for instance, Klimaszewska-Drabot 2008, figs 6: 8-9).

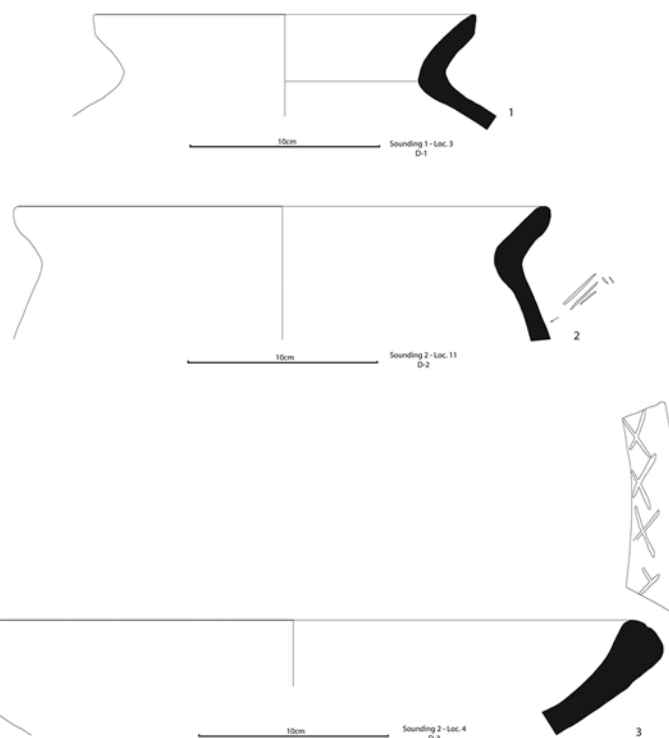


Figure 1. Classic Christian cooking pots and plates from el-Kurru - scale 1:4.

A small number of diagnostic sherds (rims and body sherds) were painted or incised, usually with wavy lines, triangular or floral motifs (Plate 5: 1-3) and sometimes with Christian symbols like a cross or a fish (Plate 5: 4-6). Decoration was generally limited to fineware cups and bowls. Particularly interesting are bowls with everted rims which were often decorated on the interior (Plate 5: 7).

The initial study of pottery from the soundings shows that the pottery assemblages were domestic and very similar in composition suggesting that the garbage deposits recovered in Soundings 1-3 may originate from the same type of domestic context. While a precise date of the pottery will need

² *Qavadis* (singular *qadus*) are jars employed on waterwheels (*saqia*) that were introduced to Nubia during the later Meroitic period, allowing for significant expansion in the area that could be irrigated.



more analysis, the current evidence suggests a date within the Classic Christian period.

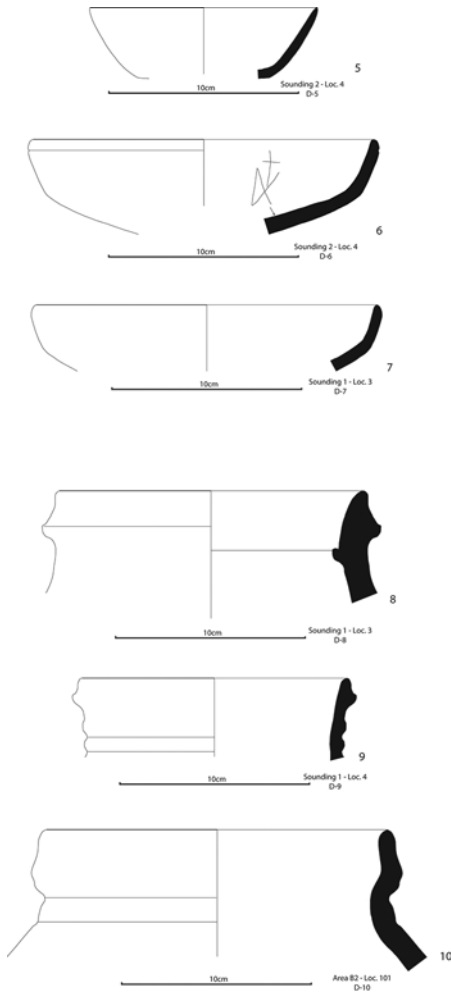


Figure 2. Classic Christian cups and qawadis from el-Kurru - scale 1:4.

Five-sided Corinthian Capitals in the Mortuary Temple at El-Kurru

Jack Cheng

One of the more unusual finds in the 2013 season at el-Kurru were two five-sided Corinthian column capitals in a rock-cut chamber of the mortuary temple (Reisner's Ku.1500). There is no clear precedent for this design, although the forms fit within the greater corpus of Ptolemaic capitals.

Rooms 3 and 4 of the mortuary temple, rock-cut chambers of roughly rectangular shape, were fitted with stone roof beams that extended from the front to the back of each room. These beams (not yet fully recovered in excavation; see Emberling Figure 3, above) were inserted into sockets in the walls and were supported in the centre of each room by four columns.

The capitals on the columns in both Rooms 3 and 4 have a shallow bowl profile, more Egyptian in shape than Classical. The capitals in Room 4 (Figure 1) are undecorated and smaller

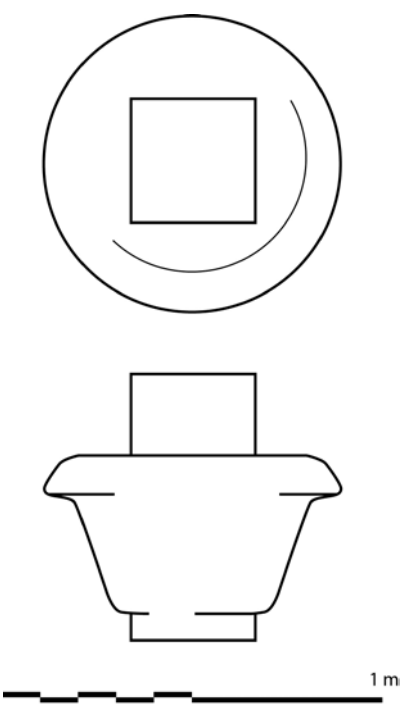


Figure 1. Plain column capital in the large mortuary temple, rock-cut Room 4.

(about 800mm diameter) than those in Room 3 (Figure 2; about 900mm diameter), suggesting that they are not unfinished capitals to be carved *in situ*, but designed to be plain. No painted decoration was visible.

Two capitals in Room 3 have been partially exposed, but neither is fully excavated (Plate 1). The design of these capitals is the main topic of this report, but the disposition of the capitals is a puzzle in itself. One of these capitals is *in situ* on a column, but

very worn (Plate 2). A better preserved capital sits upside down, near its column and resting on about a meter of fill (Plate 3). It most likely toppled after stone fell from the ceiling, loosening the connection between the stone beams and the columns. As the fill of Room 3 appeared to be water-laid, perhaps flooding from the *wadi* to the north partially filled the chamber, then caused the capital to topple.

In any case, these partially excavated column capitals have a heretofore unknown design. Based on what we could observe, these capitals appear to have five volutes, arranged around

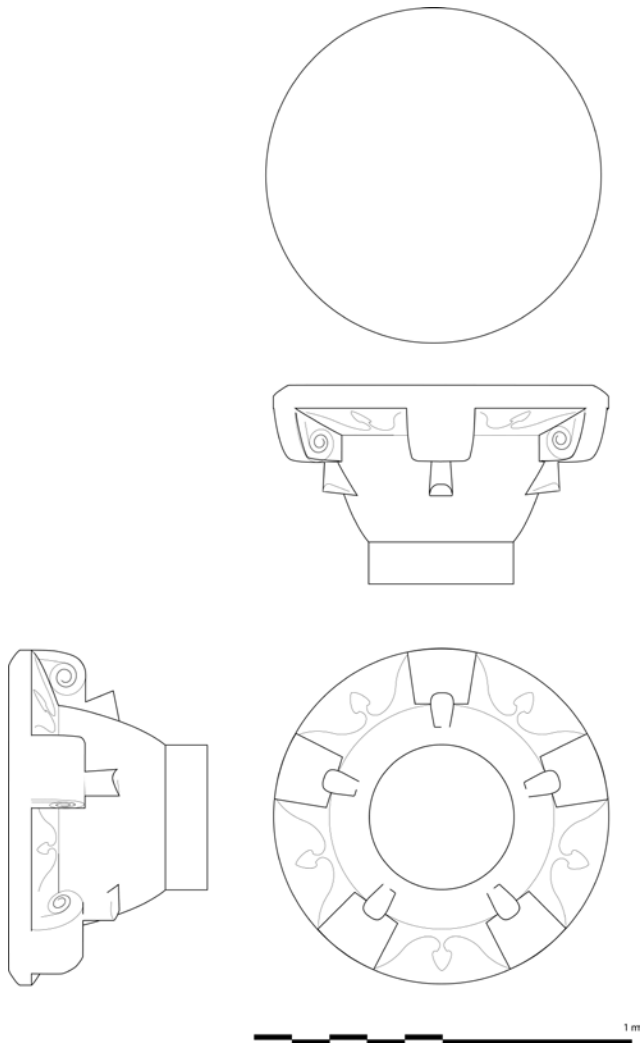


Figure 2. Column capital with five volutes in the large mortuary temple, rock-cut Room 3, including idealised rendering of lotus bud on underside of capital.

the circular capital. Below each volute, an offset juts out like the false beard beneath a pharaoh's chin. Between the volutes, lines in shallow relief trace a curve into a lotus bud (Plate 4).

This is an unusual design. Among the oddities are the greater width of the volutes, the strongly jutting offsets, the



Plate 1. Column capitals with five volutes as found in Room 3.



Plate 2. Capital with five volutes in situ on column, Room 3.



Plate 3. Capital with five volutes upside down in fill.



Plate 4. Detail of lotus bud shape on underside of capital with five volutes.

buds in low relief, and most significantly, the pentagonal organization of the entire design.

Comparisons for the decoration are closest to Ptolemaic column capitals, which introduced the volute form to North Africa from Hellenistic forebears. In the 4th and 3rd century BC, the Corinthian form had not yet been standardized in Greece, giving even more freedom to sculptors in more distant Hellenized regions (McKenzie 2007, 85). Judith Mc-



Kenzie describes four main types of Alexandrian Corinthian columns, and the el-Kurru capitals resemble most closely – albeit with significant differences – McKenzie’s Type IV (Figure 3). The earliest dated Type IV capital is from the 3rd century BC from Tomb A at Shatby and a painting in the Sidi Gaber Tomb in Alexandria shows a simplified Type IV



Figure 3. Corinthian “Type IV” capital (McKenzie 2007).

capital very much like the el-Kurru example (McKenzie 2007, 106).

Type IV is not very tall, like the el-Kurru capital. In this respect, Type IV and el-Kurru both seem to be influenced by the shallower Egyptian bell-shaped capital (cf. McKenzie 2007, figs

201-205). Type IV is also relatively simple, compared to other Corinthian types: the volutes do not disappear behind multiple acanthus leaves but instead fold back upon themselves into paired double volute shapes.

The el-Kurru Room 4 capitals are even simpler, without any significant vegetal decoration. However, there is the shallow lotus bud relief between volutes, which is not dissimilar to the negative space formed by the meeting of the double volutes; could it be a simplification of the double volute form?

Aside from decoration, there are two major deviations from the norm. First, the volutes on the el-Kurru capitals are wider than standard Ptolemaic types. Second, and more anomalous, the design is arranged pentagonally. Simply as a problem of geometry, a regular pentagon is much more difficult to create than a square, a regular hexagon or an octagon. To be sure, without fully excavating the capitals, we do not truly know how regular the pentagonal design is, or even if these capitals actually have five evenly spaced volutes. It is not impossible for the capitals to have just the four visible volutes in irregular spacing. In either case, perhaps the spread of the volutes are for a widening visual effect, like a photograph taken with a fish-eye lens – to give the illusion of a larger perspective within a small enclosed area.

The only other known five-sided Corinthian capitals are found at the Temple of Venus in Baalbek (Heliopolis) from the mid-3rd century AD and these were, before our el-Kurru finding, considered unique (e.g., Kleiner 2007, 258). In that instance, the pentagonal capitals match a pentagonal temple form. If the capitals turn out to have five sides, they would be the earliest known instance of such a design and would require more analysis and further interpretation of the five-sided form.

Geophysical Survey at the El-Kurru cemetery

Ed Blinkhorn

‘Since the work at el-Kurru, it is practically certain that all the Royal tombs of Ethiopia [sic] have now been excavated.’
(Reisner 1919, 249).

Introduction

Early focus on upstanding monuments was both understandable and necessary in Reisner’s time, and whilst the identification of horse burials close to the pyramids at el-Kurru may seem a greater feat of field survey, it seems likely that local knowledge played a part in locating them. Insights from the modern villagers may yet effect further discoveries in the cemetery, though on the surface few clear clues are to be found. To guide future research, and to contextualise Reisner’s discoveries, a preliminary season of geomagnetic survey was undertaken in the area around the royal tombs with intent to identify both grander-scale architecture and non-royal burials that may have been overlooked by Reisner.

A variety of geophysical survey techniques are available to help understand the nature of subsurface deposits (Gaffney and Gater 2003) though the instances in which one is chosen over another is dependent on many factors, including amongst others depth of target, geological substrate, ground moisture levels and modern land use. At el-Kurru, fluxgate gradiometry was selected as it can identify an assortment of different archaeological deposits and provides an appropriate balance between high sample density and area coverage in limited time. The primary aims of the survey were to characterise the nature of any archaeological deposits and to identify targets for future excavation, which were met with promising results, if a little complicated.

Methodology

Survey was conducted on a 20m grid system using a Bartington Grad-601-2 fluxgate gradiometer which measures fluctuations in the vertical component of the earth’s magnetic field at a sensitivity of 0.1nT (effective resolution 0.03nT). A number of these fluctuations, or anomalies, can be interpreted as being of archaeological interest whilst others are likely to be the result of modern activity or variations in the geology. Samples were recorded every 250mm on traverses spaced 1m apart. Data were manipulated using Geoplot v. 3.00v and are presented here with as little processing as possible; only ‘clip’, ‘zero mean traverse’ and ‘interpolate’ have been used to smooth the data, providing 3,200 data points per 20m grid square.

Three ‘fields’ were surveyed: one to the east of Pyramid 1 (coded ‘Pyramid’ for simplicity), and two to the south of the *wadi* that divides the main area of burials, on either side of the ‘Queens’ burials’ (coded QUB1 to the east and QUB2 to

the west) (Figure 1). Grid locations were surveyed with a total station theodolite to enable accurate location of geophysical anomalies on the ground. The pyramid field survey covers an area of ≈ 0.89 ha, QUB1 ≈ 0.73 ha and QUB2 ≈ 0.56 ha.

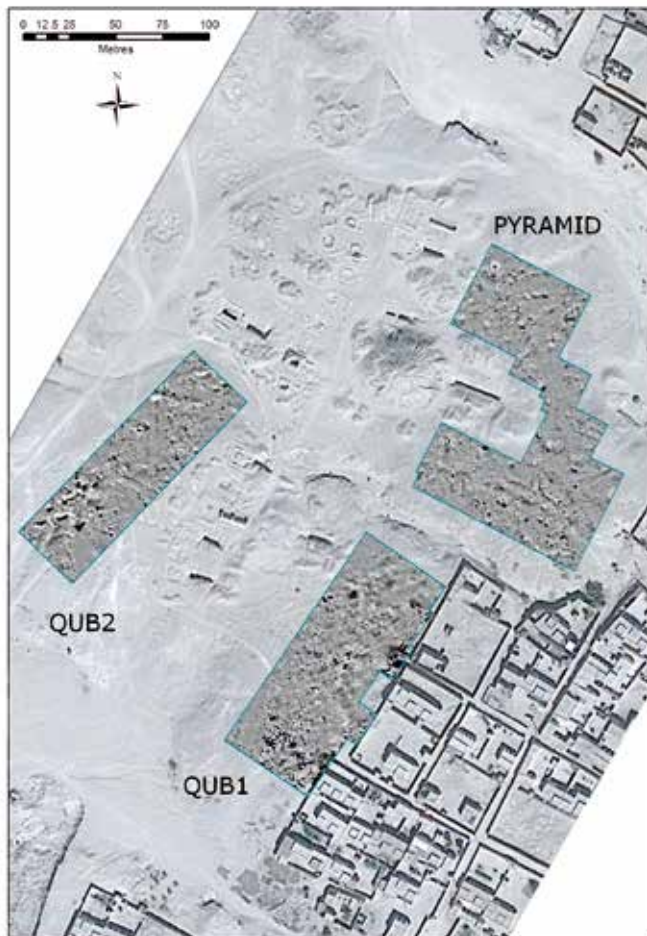


Figure 1. Overview of fluxgate gradiometer data at el-Kurru cemetery (Satellite imagery (c) DigitalGlobe, Inc.).

Results

The following three sections briefly outline preliminary interpretations of the surveys. Only the anomalies with more immediate potential are discussed but further examples are marked in the accompanying figures.

Pyramid field (Figure 2)

Four broad categories of anomaly can be identified and are shown in Figure 2. Discrete positive anomalies are found across the plot and are likely to represent cut features filled by more highly magnetically susceptible deposits than the surrounding areas. Two clusters of these are especially noteworthy (Figure 2a). The northern group is made conspicuous by the consistent dimensions and alignment of the anomalies, although the orientation of the survey does complicate confidence in the latter. The southern group comprises three rows of less distinct anomalies but are importantly located within a 'zone' bounded by a weak, indistinct circular anomaly, adjacent to similar subtle rounded anomalies. A further weak circular anomaly can be discerned in the centre of the plot

(Figure 2b) and to the south east (Figure 2c); an anomaly marked by consistent magnetic response appears to truncate a north east-south west geological anomaly with a possible pit feature in the centre.

Negative anomalies, here interpreted as representing possible structural evidence, are yet harder to identify, though this is unsurprising considering the magnetic contrast evident in the survey plot. Nevertheless, a complex of negative anomalies to the south (Figure 2d) seems to describe a structure approximately 12 x 12m in size with positive anomalies visible in the internal divisions and within the apsidal anomaly to the north east. Positive anomalies are also bounded by negative counterparts to the north east (Figure 2e) though no coherent structure is visible. The donut-shaped features (Figure 2f) are difficult to interpret though similar examples in QUB1 and QUB2 hint at an archaeological origin, albeit of unknown date.

QUB1 (Figure 3)

Archaeological anomalies in QUB1 are, in places, obscured by interference from modern ferrous responses, most clearly along the eastern edge, to the centre, and to the south (Figure 3a) where modern refuse may overlie subtler anomalies. These weaker linear responses are found across the centre and northern portions of the plot and lie east north east-west north west with corresponding perpendicular counterparts (Figure 3b – n.b., the full extent of linears is not marked), though it is difficult to refine an interpretation for these. In the centre of the plot, the surface is strewn with small natural boulders whilst the northern area is clear of these and replaced instead by irregular undulations. It is in the north of the plot that the rectilinear anomalies are both stronger and better defined, in some cases enclosing positive responses, perhaps justifying an archaeological explanation. The strongest of these is a triangular example (Figure 3c) approximately 5m in maximum width, bounded to the east by a north-south negative linear and a stronger irregular negative anomaly to the north. It is likely that this represents a cut feature, perhaps with a void to the north, though its shape is certainly unusual. Along the northern edge of the plot, two features stand out. The first is a small oval negative anomaly enclosing a weak positive response (Figure 3d) though it is difficult to determine the extent to which it relates to adjacent linears. Immediately to the west, an imprecise broad lenticular negative anomaly encircles a weaker positive counterpart (Figure 3e), which is bounded to the south by a positive anomaly with well-defined north-west and south-east sides and to the north by a narrow lunate negative anomaly (Figure 3f).

QUB2 (Figure 4)

The strongest responses in QUB2 are found to the south west on a small hillock with outcropping geology. Isolating archaeological responses in this area is difficult although two positive anomalies appear to be retained by rectilinear negative anomalies, perhaps representing walling (Figure 4a). Whereas linears in the previous fields tend to be weak

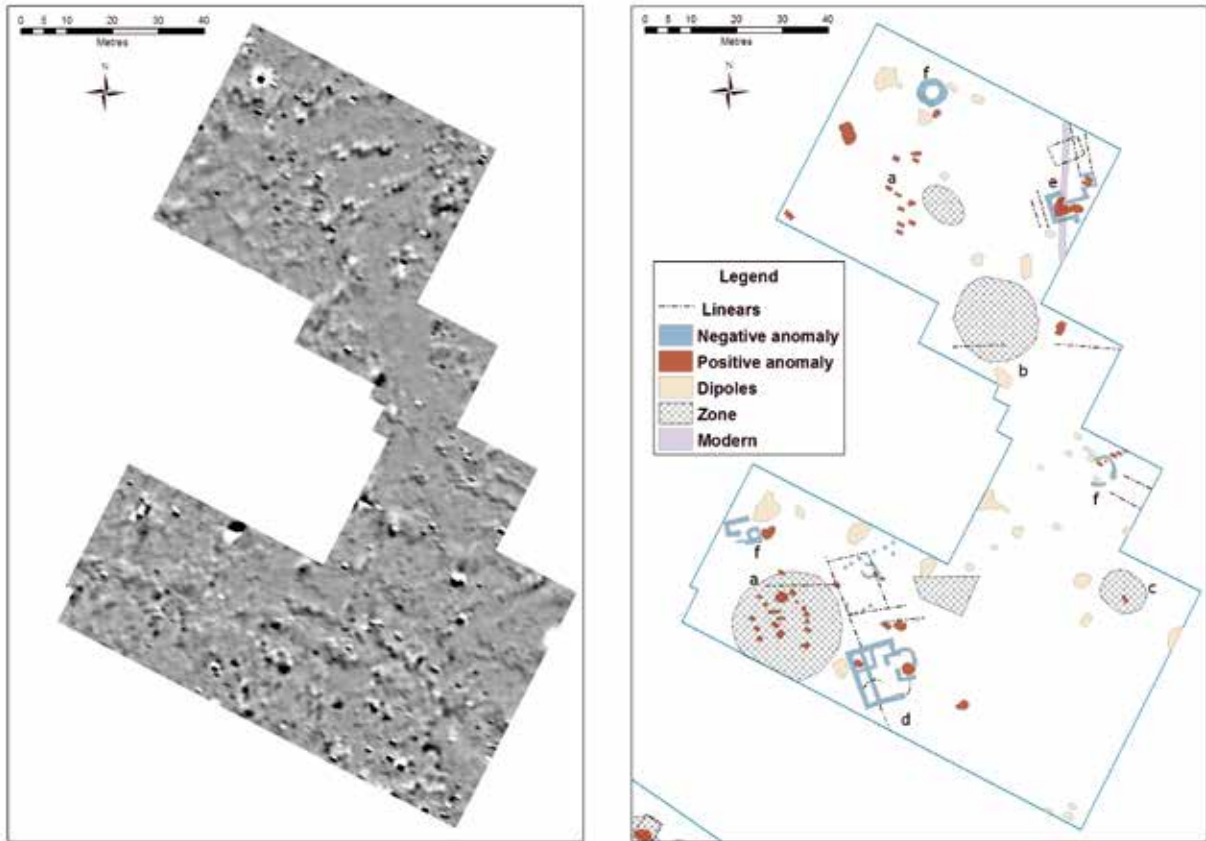


Figure 2. Fluxgate gradiometer results and interpretation in Pyramid field. Greyscale data range +10nT (black) to -10nT (white).

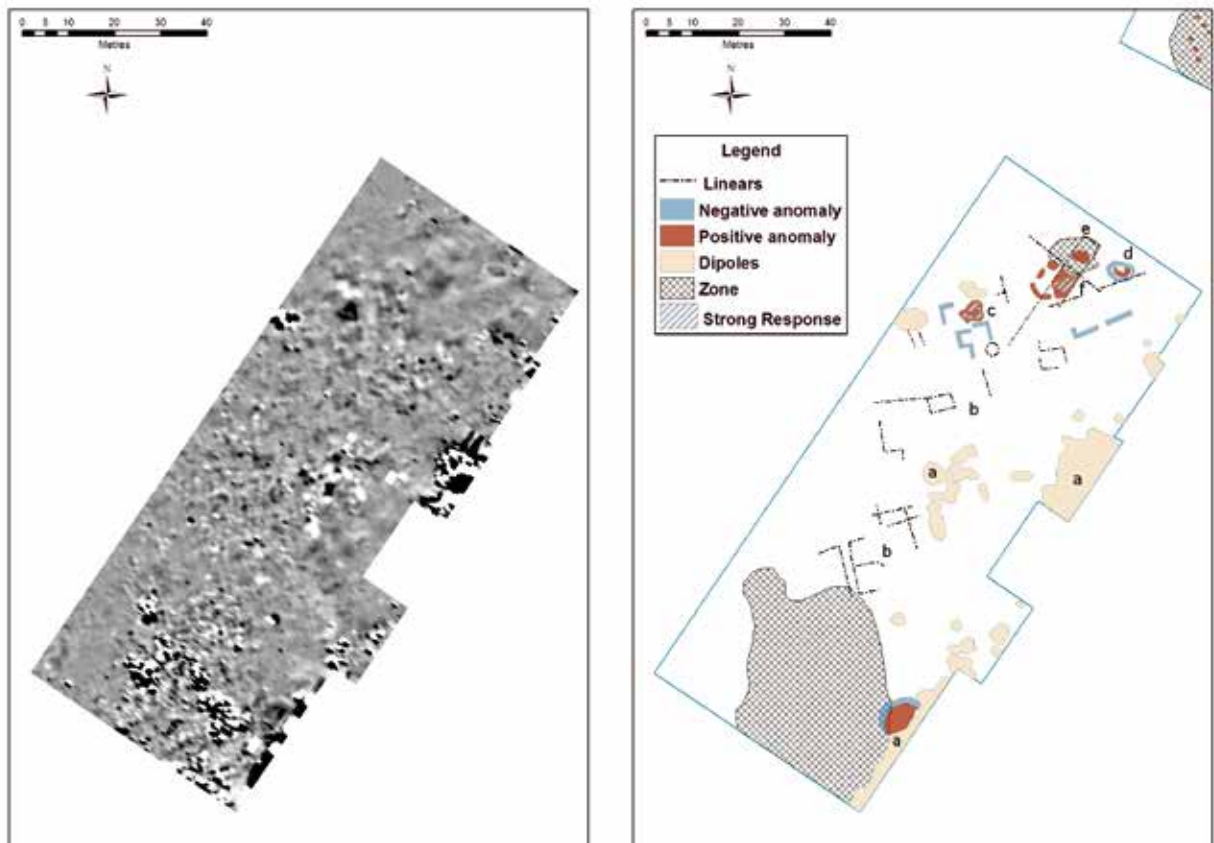


Figure 3. Fluxgate gradiometer results and interpretation in QUB1 field. Greyscale data range +12nT (black) to -12nT (white).

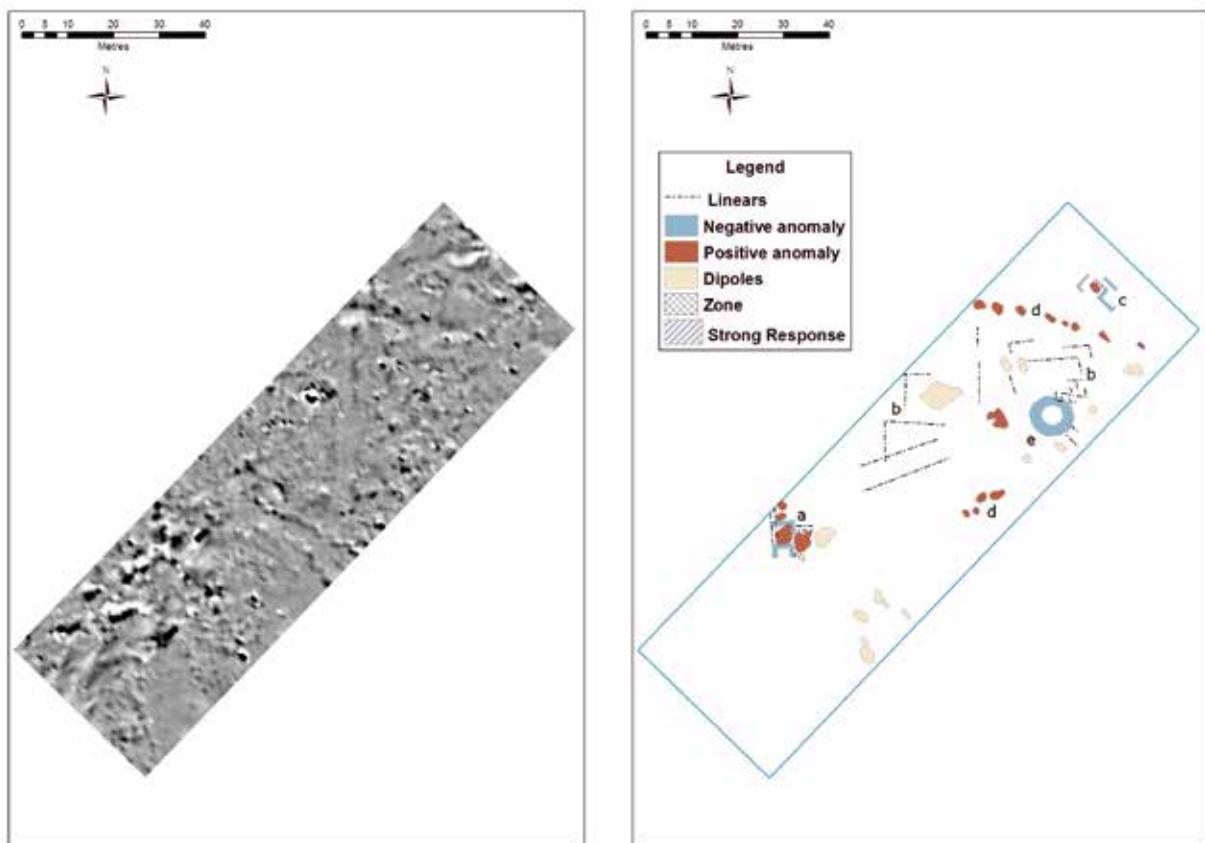


Figure 4. Fluxgate gradiometer results and interpretation in QUB2 field. Greyscale data range $+6nT$ (black) to $-6nT$ (white).

negatives, here they are typically weakly positive and oriented cardinally (Figure 4b), though may define broader negative (stone?) deposits. An exception to this is found to the north (Figure 4c) where a Nile-desert alignment can be seen. Close by and further to the south (Figure 4d), two groups of cut features may be found to respect facets of the palaeo- and contemporary landscape. Finally, the largest example (*c.* 9m diameter) of a donut-shaped feature (Figure 4e) is also situated on the slope of a small hillock and may have associated features to the south, or be related to linears to the north.

Discussion

Fluxgate gradiometers have previously been used to great effect on sites in Sudan of similar date and geomorphological setting (e.g. Spencer and Hay 2013 at Amara West; Mohamed-Ali *et al.* 2012 at Meroe; T. Herbich at Kawa, see Welsby 2009). Although the results from el-Kurru are not as definitive, lack of clarity in the surveys belies the range and scale of potential targets and there is certainly more to the data than meets the eye, whatever the date of the anomalies.

There is undoubtedly a mixture of natural and anthropogenic anomalies present and key is the distinction between the two. It remains to be shown, though it is not implausible, that structural archaeology of similar scale to that which is currently evident on the surface is represented in the data. Extricating features evident on the surface (most often shallow hollows and tracks) from those in the greyscale plots will

help considerably in understanding those anomalies that are more likely to be ancient in origin. A presumption in favour of sizeable features may also be misleading in better understanding the cemetery, skewing knowledge production towards grander architecture whilst ignoring the ephemeral. Similarly, focusing on the east south east-west north west (Nile-desert) orientation exhibited by the exposed archaeology during interpretation prohibits understanding anomalies that respect other physical landscape features, such as *wadi* edges, and ignores alteration, embellishment and reuse of these.

The nature of the anomalies is clearly a major concern and it is essential that the formation and deformation processes that constituted the archaeology are considered. For instance, large subterranean structures entered through a small surface opening are likely to be represented by only the magnetic signal of the fill of that hole, if any, and a void present within the range of the gradiometer may only subtly weaken the signal. Aspinall *et al.* (2008, 164) highlight the problems with identifying graves due to immediate backfilling and minimal magnetic material in the body providing sufficiently strong magnetic contrast, a commentary that could easily be extended to other cut features.

Future survey work would preferably extend substantially beyond the immediate area of the excavated monuments, especially to the north and east, and fill in many of the gaps within that area which were not possible to examine in 2013. Furthermore, a selection of anomalies identified above could be selected for re-survey, doubling the sample interval



and orienting survey obliquely to clarify issues of feature alignment. Other, complementary, techniques could include ground penetrating radar (GPR) or electrical resistance surveys (both area and tomographic), especially in instances where voids or complex stratigraphy are anticipated, though the primary concern in these initial stages is understanding the spatial extent of archaeological responses.

The interpretations provided in this paper should not be considered a finished product. The value in these plots will not fully be realised until a phase of intrusive testing has clarified the nature and derivation of targeted anomalies. An understanding of the interaction between geological, pedological, ancient and more recent anthropogenic processes through test-pitting or trenching can then be iterated in a further phase of survey interpretation. There is of course also intrinsic value in the surveys as archival statements of geomagnetism to enable reinterpretation of the potential of the cemetery by those with greater experience, using new interpretational methodologies, or in the light of discoveries elsewhere. Using geophysics to gain a landscape-scale perspective of the situation of the archaeology provides the first step in appreciating a broader view of life and death before, during and after the reign of the 25th Dynasty.

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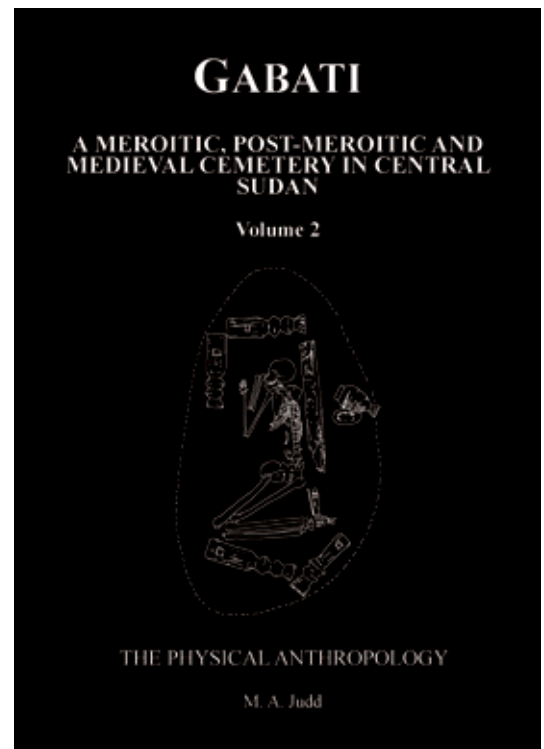
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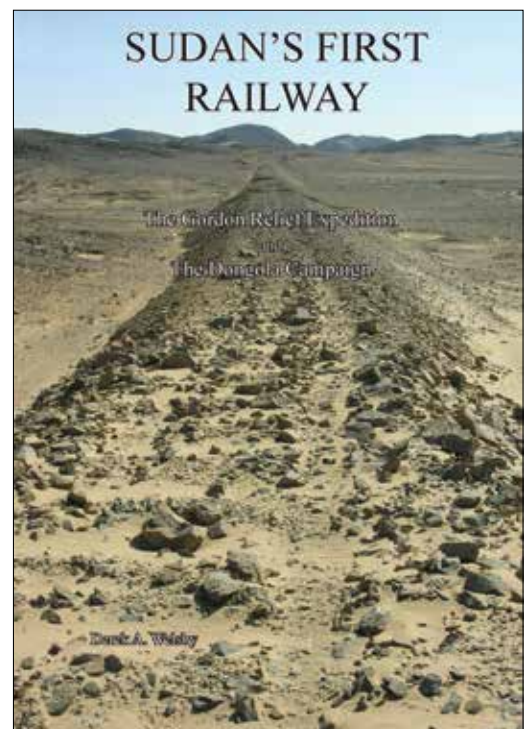
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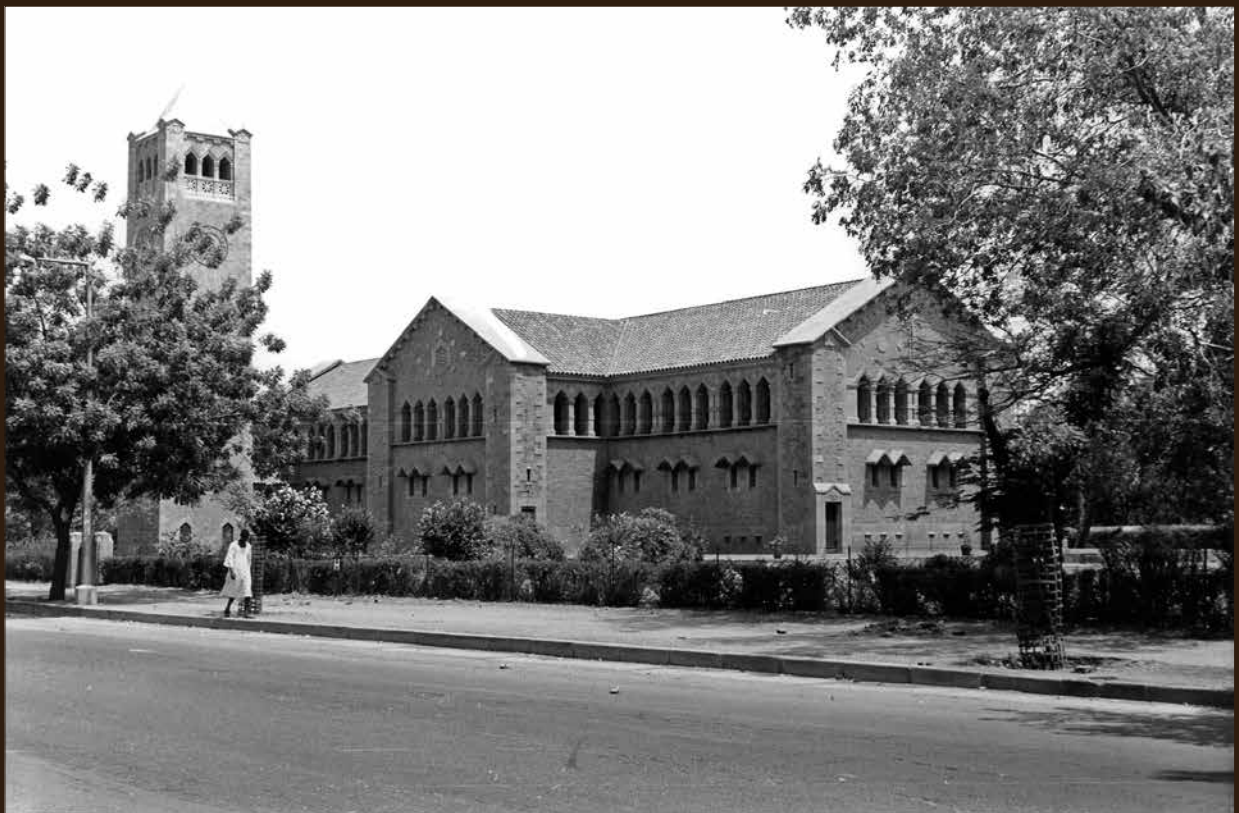
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